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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/981,848	10/16/2001	Seiji Sarayama	2271/66100	7977

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RICHARD F. JAWORSKI  
Cooper & Dunham LLP  
1185 Avenue of the Americas  
New York, NY 10036

EXAMINER

ANDERSON, MATTHEW A

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 08/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/981,848

Applicant(s)

SARAYAMA ET AL.

Examiner

Matthew A. Anderson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 May 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-58 is/are pending in the application.
- 4a) Of the above claim(s) 7-10, 19-21 and 28-58 is/are withdrawn from consideration.
- 5) ☐ Claim(s) 11-18 is/are allowed.
- 6) ☒ Claim(s) 1-6 and 22-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 October 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All   b) ☐ Some \*   c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.                      6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of group I in Paper No. 5 is acknowledged. The traversal is on the ground(s) that the claims are sufficiently related to each other for concurrent examination. This is not found persuasive because a serious burden exists in the differing issues likely to arise during the prosecution of different classes of invention.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 7-10, 19-21, 28-58 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected groups II, III, and IV, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 5.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-4,6, 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gavrilin et al. (Perspektivnye Materialy Vol. 1999, No. 2, pp. 22-25, 1999 (in Russian)).

Gavrilin discloses liquid phase gallium nitride epitaxy from gallium–lithium melts. The abstract discloses that the pressure of the vessel was elevated to 1 to 3 ATM. The high pressure suggests a way of confining the highly heated vapors in the vessel. Lithium is a well known alkaline metal. GaN requires a nitrogen source material (see page 22 equations 1 and 2). The atomic percentage of Li in the melt was between 1 at % and 20 at % (abstract). Temperature is described throughout the paper in respect to the melt and crystal growth.

In respect to claim 1, it would have been obvious to one of ordinary skill in the art at the time of the present invention to contain the alkaline metal in the LPE growth method for forming GaN because such would have kept the growth parameters constant as was reported in several trials such as Fig. 1, 2, and 3 in Gavrilin et al.

In respect to claim 2, it would have been obvious to one of ordinary skill in the art at the time of the present invention to supply nitrogen material from the outside of the vessel into the reaction zone and prevent any blockage of that nitrogen material because Gavrilin et al. suggest a flow of ammonia gas into the vessel and suggest the process is continuous requiring that the flow not be disrupted.

In respect to claims 3 and 4, it would have been obvious to one of ordinary skill in the art at the time of the present invention to optimize the temperature of the melt such that it does not condense because temperature control is described throughout Gavrilin

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et al. as an important process parameter, such optimization would have been achieved by only routine experimentation (as presented by Gavrilin et al.), and such a condensation would be known to the skilled artisan to change the thermodynamics of the vessel.

In respect to claim 6, it would have been obvious to one of ordinary skill in the art at the time of the present invention to modify the direction in which the nitrogen material is supplied because although the prior art shows vertical supply pipes no limitation is given to this direction and one of ordinary skill would not have expected this to effect the product as long as the nitrogen material was supplied for growth.

In respect to claim 22, it would have been obvious to one of ordinary skill in the art at the time of the present invention from the disclosure of Gavrilin et al. to form a liquid metal containing an alkaline metal and a group-III metal in a vessel, to grow a group III- nitride as claimed in claim 22 step (b), comprising the group-III metal and nitride, and creating a local concentration distribution of dissolved nitrogen in the molten liquid because such was directly suggested by Gavrilin et al. in equations 1 and 2 describing their process.

### ***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 5, 23-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The examiner notes MPEP 2173.05(p) in which a single claim that claims both an apparatus the method steps of using that apparatus is indefinite under 35 U.S.C. 112, 2<sup>nd</sup> para.

***Claim Rejections - 35 USC § 101***

7. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 5, 24-27 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The examiner notes MPEP 2173.05(p) that directs claims which claim both an apparatus and a method of using that apparatus should be rejected under 35 U.S.C. 101 based on the theory that the claim is directed to neither a "process" nor a "machine," but embraces or overlaps two different statutory classes of invention set forth in 35 U.S.C. 101 which is drafted so as to set forth the statutory classes of invention in the alternative only.

***Allowable Subject Matter***

8. Claims 12-17 are allowed.

9. The following is an examiner's statement of reasons for allowance:

The prior art has not suggested the claimed method of claim 11 for growing group-III nitride crystals from a liquid phase (as described in the specification). In particular, the closest prior art of Gavrilin et al. does not suggest the up-down cycling of temperature and pressure during the growth process.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew A. Anderson whose telephone number is (703) 308-0086. The examiner can normally be reached on M-Th, 6:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

MAA  
July 28, 2003

*Matthew Anderson*  
*A.U. 1765*